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AUTHOR Golub, Lester S.
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ABSTRACT

This report summarizes four English Language Arts studies sponsored by the Wisconsin Research and Development Center for Cognitive Learning under the project title "A Structure of Concept Attainment Abilities": (1) "Selection and Analysis of Language Arts Concepts for Inclusion in Tests of Concept Attainment," (2) "Items to Test Level of Attainment of Language Arts Concepts by Intermediate-Grade Children," (3) "Measuring Language Arts Concepts Attainment: Boys and Girls," and (4) "An Analysis of Content and Task Dimensions of Language Arts Items Designed to Measure Level of Concept Attainment." Results indicate that boys and girls do not learn concepts equally well; that some English language arts concepts which are taught are not learned well; that the most difficult category of concepts is that dealing with "Words in Sentences," the easiest deals with "Words," and "Connected Discourse" falls in the middle; that the concepts appear to measure the factor "Attainable Language Competence"; that the tasks appear to measure the factor "Language Processing Ability"; and that "Attainable Language Competence" and "Language Processing Ability" are two independent learning modes. (Author/DD)

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Measuring English Language Arts Concept Attainment

Lester S. Golub

The Pennsylvania State University

INTRODUCTION

Four English Language Arts studies sponsored by the Wisconsin Research and Development Center for Cognitive Learning under the project title "A Structure of Concept Attainment Abilities," CAA, are summarized in this report. The titles of these four studies are:

(1) Selection and Analysis of Language Arts Concepts for Inclusion in Tests of Concept Attainment [1]

(2) Items to Test Level of Attainment of Language Arts Concepts by Intermediate - Grade Children [2]

(3) Measuring Language Arts Concepts Attainment: Boys and Girls.[3]

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[1] L. S. Golub, W. C. Fredrick, N. J. Nelson, and D. A. Froyer, Selection and Analysis of Language Arts Concepts for Inclusion in Tests of Concept Attainment. Working Paper No. 59, (Madison: The Wisconsin Research and Development Center for Cognitive Learning, Nov. 1971).

[2] L. S. Golub, W. C. Frederick, N. J. Nelson, Items to Test Level of Attainment of Language Arts Concepts by Intermediate - Grade Children, Working Paper No. 60, (Madison: The Wisconsin Research and Development Center for Cognitive Learning, Nov. 1971.

[3] L. S. Golub, W. C. Fredrick, and M. L. Harris, Measuring Language Arts Concepts Attainment: Boys and Girls, Technical Report No. 199, (Madison: The Wisconsin Research and Development Center for Cognitive Learning, Nov. 1971).

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(4) An Analysis of Content and Task Dimensions of Language Arts Items Designed to Measure Level of Concept Attainment.[4]

Purpose

The primary objectives of the English language arts portion of the CAA Project were the following:

(1) To identify basic concepts in English language arts appropriate to and generally taught at the fourth grade level.

(2) To develop test items to measure achievement of these concepts.

(3) To identify criterion tasks for measuring cognitive abilities in the English language arts.

(4) To study the relationship of learned English language arts concepts and criterion tasks.

Concepts may be defined in one or more of four ways:

(1) Classificatory, in terms of properties or attributes.

(2) Semantically, in terms of synonyms and antonyms.

(3) Operationally, in terms of distinguishing features.

(4) Axiomatically, in terms of logical or numerical relationships.[5]

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[4]M. L. Harris and L. S. Golub, An Analysis of Content and Task Dimensions of Language Arts Items Designed to Measure Level of Concept Attainment, Technical Report No. 200, (Madison: The Wisconsin Research and Development Center for Cognitive Learning, Nov. 1971).

[5]H. J. Klausmeier, L. W. Harris, and J. K. Davis, Strategies and Cognitive Processes in Cognitive Learning. (The University of Wisconsin Cooperative Research Project No. 2850, 1968).

The classificatory definition of "concept," readily specifiable properties or attributes, was the one used in this project.

Selection of Concepts

The domain of concepts from which ultimately thirty (30) concepts were chosen consisted of all those single words or phrases which seemed to be classificatory and which were treated in some way in the fourth grade English language arts curriculum. Six current textbook series were searched and all classificatory concepts listed in the body or in the index of these texts were recorded.

This huge number of concepts was then delimited, since not all of the language arts curriculum seemed equally appropriate to the classificatory notion of "concept." Three areas were chosen which seemed to contain the majority of concepts: (1) Words, (2) Words in Sentences, and (3) Connected Discourse. Words contained the concepts related to letters, letter sounds, word parts, and word types, and word meanings. Words in Sentences contained the concepts of parts of speech, sentence punctuation, types of sentences, and word function. Connected Discourse contained the concepts of paragraphing, sentence function, and letter writing. Consequently, major areas of the English language arts curriculum such as rules of correct word usage and spelling, skills of oral and written composition, listening skills, reading of literature, courtesy, telephoning, and penmanship were omitted.

That a concept is listed in six textbook series does not guarantee that the concept is actually taught by teachers. A

list of concepts was submitted to fourth grade teachers in the district from which students were to be tested. Teachers were asked to indicate: (a) Do you teach this concept in fourth grade? (b) Do 80-90% of your students know the definition of this concept? (c) Do you think 80-90% of your students are able to pronounce and select the correct meaning of the concept? As a result of this information, thirty English language arts concepts were finally selected for analysis and testing (Table 1). The total list of 91 possible concepts can be found in Working Paper No. 59.

Insert Table 1 about here.

Analysis of Concepts

In order to teach a concept, one must analyze the concept into its teachable elements. In order to test a child's mastery of a concept, one must develop test items directly related to the teachable elements of the concept. The thirty English language arts concepts were analyzed according to a paradigm developed for testing levels of concept attainment.[6] Table 2 shows the twelve tasks that test aspects of concept attainment as presented in the schema for measuring the understanding of a concept.

Insert Table 2 about here.

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[6] Frayer, D. A., W. C. Fredrick, and H. J. Klausmeier. A Schema for Testing the Level of Concept Mastery, Working Paper No. 16, (Wisconsin Research and Development Center for Cognitive Learning, 1969).

In the cases where concepts shared relevant attributes, the more general concept was called the "supraordinate concept," the more specific concept, the "subordinate concept." Figure 1 shows the hierarchical relationships of concepts in the area of Words; Figure 2, relationships in the area of Words in Sentences; and Figure 3, relationships in the area of Connected Discourse.

Insert Figures 1, 2, and 3 about here

The steps included in the selection and analysis of fourth grade English language arts concepts to be tested were:

(1) Identification of the major areas within the subject matter of English language arts.

(2) Selection of three of these major areas to be studied.

(3) Identification of classificatory concepts within each of these major areas.

(4) Random sampling of ten concepts from those identified for each of the three major areas selected.

Using the analysis of a concept as the basis for appropriate content and the 12 tasks of the schema as the basis for appropriate tasks, 12 multiple choice test items were developed for each of the 12 tasks, except for Task 11 for five concepts which had no identifiable subordinate concept. A total of 355 English language arts items were developed for the purpose of measuring and assessing concept attainment in the English language arts. All 355 test items can be found in Working Paper No. 60.

Developing Test Items

Considerations for writing the test items were threefold. First, it was important to represent the types of tasks outlined in the schema developed for testing concept mastery. Second it was necessary to make the vocabulary simple enough to assume readability. Third, it was necessary to construct reasonable distractors (wrong answers of multiple-choice test items). A serious attempt was made to use distractors that were related in some way to the concept or that fit into some general English language arts area. Illustrative items for each task type for the possessive noun are as follows:

Task 1. Given the name of an attribute, select an example of the attribute.

Test item:

Which of the following shows ownership?
A. They're fun
*B. the doctor's house
C. could've bought
D. he said, "Hello"

Task 2. Given an example of an attribute, select the name of the attribute.

Test item:

"The man's dog ran away." In this sentence, man's dog shows:
A. Letters left out.
*B. ownership.
C. a compound word
D. plural form

Task 3. Given the name of the concept, select an example of the concept.

Test item:

Which of these is a possessive noun?
*A. boys'
B. our
C. can't
D. oxen

Task 4. Given the name of a concept, select a non-example of the concept.

Test item:

Which is NOT a possessive noun?
A. children's
B. pigs'
*C. we've

Task 5. Given an example of a concept, select the name of the concept.

Test item:

Boys' is an example of:
A. a contraction
*B. a possessive noun
C. a pronoun
D. an abbreviation

Task 6. Given the name of a concept, select the relevant attribute.

Test item:

A possessive noun always needs:
A. a capital letter
B. a plural noun
*C. an apostrophe

Task 7. Given the name of a concept, select the irrelevant attribute.

Test item:

A possessive noun is NOT always:
A. a word showing ownership
B. found with a mark of punctuation
*C. plural

Task 8. Given the definition of a concept, select the name of the concept.

Te item:

The form of a noun that shows ownership is called:
A. a contraction
B. a proper noun
*C. a possessive noun
D. a suffix

Task 9. Given the name of a concept, select the definition of the concept.

Test item:

What is the meaning of possessive noun?
A. a shortened form of a word that is made up of two words
B. a word in which letters have been left out
C. the word which shows who spoke
*D. a word that shows ownership

Task 10. Given the name of a concept, select a supraordinate concept.

Test item:

A possessive noun is a kind of:
*A. part of speech
B. word ending
C. sentence
D. end punctuation

Task 11. Given the name of a concept, select the subordinate concept.

Test item:

Which of these can be a kind of possessive noun?
A. a suffix
B. an adjective
C. a verb
*D. a plural word

Task 12. Given the name of two concepts, select the relationship between them.

Test item:

What is true about a possessive noun and a possessive pronoun?
A. A possessive noun shows tense and a possessive pronoun does not.
B. A possessive noun is found in the subject of a sentence but a possessive pronoun is not.
C. Both possessive noun and possessive pronoun are found in every sentence.
*D. A possessive noun has a mark of punctuation, but a possessive pronoun has no punctuation.

*Asterisk indicates correct answer.

Test Validity

After the 355 items were written, in order to assure content validity, two persons who were familiar with the schema for testing concept attainment, but who were not involved in the item development process, classified five random sets of 72 items according to content and task. They were able to classify all but a very few items. Any questions were mutually resolved with an assist from the principal investigator.

Subjects and Data Collection

Because pilot studies indicated that the English language arts concepts selected were very difficult for fourth graders, the decision was made to test fifth grade students with these concepts which he had selected from fourth grade textbooks. These thirty English language arts items were administered to 186 boys and 259 girls who were just beginning the sixth grade during the fall of 1970 in the public school system of Madison, Wisconsin. Subjects were randomly selected and those completing the testing program were paid $7 50. The mean I.Q. (Lorge-Thorndike) for 161 boy subjects was 106.11; for 239 girl subjects, 112.23. The mean reading comprehension score (Iowa Basic Skills) for 181 boy subjects was 5.29; for 247 girl subjects, 5.97. A distribution of fathers occupations showed 248 in professional and white collar jobs, and 210 in laborer and blue collar jobs.

The data were collected during five, 2-hour testing sessions from mid-October to early November. The English language arts items were arranged in five, 71-item "tests." The order of the items was assigned randomly over the 355

items. Two different random orders were used, one for each school. The items were arranged in five test booklets according to the random order. The students responded by marking directly on an answer sheet read by machine and punched on data cards. The tests were given by experienced test administrators to groups of approximately 30 subjects each. Figure 4 is an item matrix for each individual. The treatment of the data consisted of (1) reliability estimation and (2) factor analysis.

Insert Figure 4 about here.

Reliability

Table 3 and Table 4 contain the mean, standard deviations, and Hoyt reliability estimates for 30 concepts and 12 tasks respectively.

Insert Tables 3 and 4 about here.

Table 3 shows test results and reliability estimates for the 30 concepts tested. The most difficult concepts appear to be Adjective, Helping Verb, Predicate, and Topic Sentence. The easiest concepts are Question Mark, Thank You Letter, Silent Letter and Sentence. The reliability estimates for these 30 concepts range from .47 to .80.

Table 3 shows that the easiest concepts for girls are not necessarily the easiest for boys. The average difference between boys and girls is about one half of a standard deviation.

The concepts dealing with Area 1, Words, concepts 1-10, are the easiest for intermediate grade children. The easiest concepts for boys are Consonants, Short Vowels, and Silent Letters; the most difficult for boys are Suffix and Synonyms.

The concepts dealing with Area 2, Words in Sentences, concepts 11-20, are the most difficult for both boys and girls. The most difficult concepts in this group are Adjective, Helping Verb, Predicate, Possessive Noun, and Pronoun; the easiest are Period and Question Mark.

The group of concepts dealing with Area 3, Connected Discourse, concepts 21-30, represent middle-difficulty concepts. The most difficult are Heading and Topic Sentence; the easiest are Thank You Letter and Title. The level of attainment of concepts taught in the intermediate grades, as shown in Table 3, indicates areas of needed teaching and testing emphasis.

In Table 4, Hoyt reliabilities range from .72 to .89, showing that each task has a fairly high consistency even though questions within a task measure 30 different concepts. In general, the tasks seem more difficult as the students move from task 1 to task 12; however, this is not an ordered progression. The correlation between the rank-order of difficulty and the task number is .85. Students tend to know attributes, examples, and relationships of concepts for only half to two-thirds of the English language arts concepts taught them in preceding years of school.

Although girls are approximately one-half of a standard deviation above boys for all tasks, both boys and girls have certain tasks which are either easy or difficult. The easiest task is to select examples of a named attribute; the most difficult task is to relate logically two concepts and to conclude with a principle. The selection of a supraordinate concept is not necessarily difficult; the selection of a subordinate concept is the second most difficult task. The third most difficult task is to determine the irrelevant (nondistinguishing) attributes of a concept. Table 4 presents a reading of intermediate-grade students ability to think about language arts concepts.

An extensive table which gives a summary of item data for the correct responses to all 355 items can be found in Technical Report No. 119. Generally, the items are distributed adequately across a range of difficulty. The fact that 94% of the items display no obvious weaknesses implies that the items used to test the attainment of English language arts concepts by intermediate grade children as displayed in Working Paper No. 60 can be used by researchers and teachers.

Factor Analysis

Factor analysis statistical techniques were applied to the mean scores for boys and girls on the 355 English language arts test items. A complete discussion of the factor analysis can be found in Technical Report No. 200. The purpose of the factor analysis is to determine: (1) the intercorrelation of English language arts concepts, boys; (2) the intercorrelation

of English language arts concepts, girls; (3) the intercorrelation of English language arts tasks, boys; and (4) the intercorrelation of English language arts tasks, girls.

The main conclusion drawn from the factor analysis of the intercorrelation of the English language arts concepts is that all 30 concepts, Table 5, are measures of a single functional relationship existing among concepts. This single functional relationship can be thought of as an Attainable Language Competence, ALC. This attainable Language Competence can be described as the knowledge about the English language which a child learns either through intuitive processes or through instructional processes.

Insert Table 5 about here.

Table 5 shows that for boys Alpha yields just one common factor. The coefficients on this factor are all quite uniform for the 30 concepts. For the girls, Table 5 shows that Alpha yields two common factors for girls as contrasted with only one for boys. A common factor is defined as one having at least two variables with coefficients greater than .30. A-1 is a very general factor including all of the concepts from Area 1, Words, all except Heading from Area 3, Connected Discourse, and four from Area 2, Words in Sentences, Periods, Question Mark, Sentence, and Present Tense, none of which are parts of speech. The six concepts that are parts of speech appear on A-2 and are the main variables in that factor.

The main conclusion drawn from the factor analysis of the intercorrelation of the 12 concept attainment tasks, Table 6, is that all 12 are a measure of an underlying ability. This underlying ability can be described as a Language Processing Ability, LPA, a person's ability to think about language as a human, mentalistic activity.

Insert Table 6 about here.

The results of a three-mode factor analysis indicates that there is no interaction between concepts and tasks. It is reasonable to regard the concepts and the tasks as being two independent learning modes. Tables for the three-mode factor analysis can be found in Technical Report No. 200.

Summary and Conclusion

The dominant question being asked by this research project is: How well do intermediate grade students attain concepts which their teachers and textbook writers claim they have taught these students in the English language arts?

Before this question can be answered the following two subordinate questions must be asked:

(a) What are the English language arts concepts taught in the intermediate grades that can be tested?

(b) What are the tasks which a student can perform on a concept to show that he knows the concept?

(c) Can a test be devised which will determine student knowledge of thirty concepts on twelve tasks designed for measuring concept attainment.

This research serves as a model for developing measurement items for concept attainment in the English language arts.

A method of isolating English language arts concepts was explained and test items were developed for measuring these concepts according to a task oriented schema for measuring concept attainment. The reliability estimates and factor analysis of the 355 test items developed for this research are also presented here.

The final results indicate that: (1) Boys and girls do not learn concepts equally well. (2) Some English language arts concepts which are taught are not learned well. (3) The most difficult category of concepts is that dealing with Words in Sentence; the easiest, dealing with Words, Connected Discourse falling in the middle. (4) What the concepts appear to measure is an English language arts factor called Attainable Language Competence. (5) What the tasks appear to measure is an English language arts factor called Language Processing Ability. (6) Attainable Language Competence and Language Processing Ability are two independent learning modes.

Although this research suggests a systematic way of writing test items to determine students concept attainment in the English language arts, it also suggests an instructional method of selection and logical analysis of English language arts concepts.

Table 1

Thirty Language Arts Concepts Finally Selected for Analysis and Testing

Area I: Words	Area II: Words in Sentences	Area III: Connected Discourse
abbreviation	adjective	comparison
compound	helping verb	detail
consonant	period	explanation
contraction	possessive noun	greeting
homonyms	predicate	heading
short vowel	present tense	paragraph
silent letter	pronoun	return address
suffix	question mark	thank you letter
synonym	sentence	title
word	verb	topic sentence

Table 2

Twelve Tasks That Test Aspects of Concept Attainment

Level	Given the . . .	the student can select the	Prototype of Item Stem
1	Name of an attribute	Example of the attribute	Which is (name of an attribute)?
2	Example of an attribute	Name of the attribute	(Example of an attribute) is an example of:
3	Name of a concept	Example of the concept	Which of these is (name of concept)?
4	Name of a concept	Non-example of the concept	Which of these is NOT (name of concept)?
5	Example of a concept	Name of the concept	(Example of concept) is an example of:
6	Name of a concept	Name of the relevant attribute of the concept	What is always true about (name of concept)?
7	Name of a concept	Name of the irrelevant attribute of the concept	What is NOT always true about (name of concept)?
8	Definition of a concept	Name of the concept	(Definition) is called:
9	Name of a concept	Definition of the concept	What is the meaning of (name of concept)?
10	Name of a concept	Name of the supraordinate concept	(Name of concept) is a kind of/use of/part of:
11	Name of a concept	Name of the subordinate concept	Which of these is a kind of/use of/part of (name of concept)?
12	Names of two concepts	Statement which relates the two concepts	Which is true about (name of concept) and (another concept)?

Table 3

Language Arts Test Results for the 30 Concepts

No.	Concept	Boys (N = 186)				Girls (N = 259)			
		Mean	S.D.	Hoyt R.	S.E	Mean	S.D.	Hoyt R.	S.E.
1	Abbreviation	6.8	2.8	71	1.5	8.4	2.6	.72	1.3
2	Compound Word	6.8	2.7	69	1.5	8.5	2.5	.70	1.3
3	Consonant	7.3	2.6	.67	1.4	8.4	2.4	.68	1.3
4	Contraction	6.2	2.9	.73	1.5	7.6	3.0	.77	1.4
5	Homonym	6.8	2.7	.69	1.4	8.3	2.5	.69	1.3
6	Short Vowel	7.5	2.9	.76	1.4	8.6	2.7	.75	1.3
7	Silent Letter	7.4	2.8	.70	1.4	9.0	2.6	.74	1.3
8	Suffix	6.0	3.3	.80	1.4	7.2	3.3	.80	1.4
9	Synonym	6.1	2.8	.68	1.5	7.6	2.7	.70	1.4
10	Word	6.8	2.8	.71	1.4	8.0	2.6	.70	1.4
11	Adjective	4.6	2.6	.65	1.5	5.5	2.9	.72	1.4
12	Helping Verb	4.9	2.2	.47	1.5	5.7	2.3	.52	1.5
13	Period	7.0	2.7	.67	1.5	8.5	2.4	.68	1.3
14	Possessive Noun	5.8	2.7	.67	1.5	6.9	2.7	.69	1.4
15	Predicate	5.1	2.7	.67	1.5	6.3	3.0	.74	1.5
16	Present Tense	6.0	2.7	.68	1.5	7.1	2.7	.72	1.4
17	Pronoun	5.5	2.7	.66	1.5	6.5	2.8	.72	1.4
18	Question Mark	7.9	2.9	.76	1.3	9.6	2.5	.77	1.2
19	Sentence	6.9	2.9	.72	1.5	8.7	2.7	.75	1.3
20	Verb	6.3	2.8	.69	1.5	7.1	2.9	.75	1.4
21	Comparison	6.2	2.9	.72	1.5	7.4	2.8	.72	1.4
22	Details	6.1	2.7	.68	1.5	7.3	2.8	.73	1.4
23a	Explanation	6.0 (6.5)	2.7	.70	1.4	6.7 (7.3)	2.7	.72	1.4
24	Greeting	6.7	2.6	.67	1.4	8.0	2.4	.67	1.3
25a	Heading	4.9 (5.3)	2.3	.59	1.4	5.9 (6.4)	2.5	.69	1.3
26a	Paragraph	6.5 (7.1)	2.7	.71	1.4	7.7 (8.4)	2.6	.75	1.3
27a	Return Address	6.9 (7.5)	2.3	.64	1.3	8.1 (8.8)	2.0	.57	1.2
28a	Thank You Letter	7.2 (7.8)	2.7	.74	1.3	8.6 (9.4)	2.3	.73	1.1
29	Title	7.2	2.9	.73	1.4	8.7	2.4	.68	1.3
30	Topic Sentence	5.1	2.4	.58	1.5	6.4	2.7	.67	1.5

[a]Denotes concepts tested by 11 items rather than 12. These concepts did not have appropriate subordinates as required in Task 11. The numbers in parentheses are extrapolations based on 12 items.

Table 4

Language Arts Test Results for the 12 Tasks

Task No	No. of Items	Boys (N = 186)				Girls (N = 259)			
		Mean	S.D.	Hoyt R.	S.E.	Mean	S.D.	Hoyt R.	S.E.
1	30	19.4	6.3	.87	2.2	23.1	5.3	.86	1.9
2	30	17.2	6.3	.86	2.3	20.7	5.7	.85	2.2
3	30	18.0	5.9	.84	2.3	21.4	5.2	.83	2.1
4	30	18.0	5.4	.80	2.4	21.0	5.3	.82	2.2
5	30	16.6	6.1	.84	2.4	19.8	5.4	.83	2.2
6	30	15.4	6.3	.85	2.4	19.0	6.3	.86	2.3
7	30	14.4	5.2	.75	2.5	16.8	5.3	.78	2.5
8	30	15.6	7.0	.88	2.4	19.3	6.8	.89	2.2
9	30	16.3	6.6	.87	2.4	19.5	6.4	.87	2.2
10	30	16.1	6.3	.85	2.4	19.4	6.0	.86	2.2
11a	25(30)	11.4(13.7)	4.3	.72	2.2	13.5(16.2)	4.4	.75	2.2
12	30	12.3	5.2	.78	2.4	15.1	5.7	.82	2.4

Task No	Task Description	Mean Number Correct for Boys and Girls	Rank-Order of Tasks
1	Given name of attribute, select example.	21.6	1
2	Given example of attribute, select name.	19.3	4
3	Given name of concept, select example.	20.0	2
4	Given name of concept, select nonexample.	19.8	3
5	Given example of concept, select name.	18.5	5
6	Given concept, select relevant attribute	17.6	9
7	Given concept, select irrelevant attribute	15.8	10
8	Given definition of concept, select name.	17.8	8
9	Given name of concept, select definition.	18.2	6
10	Given concept, select supraordinate concept.	18.1	7
11a	Given concept, select subordinate concept.	12.7 (15.2)	11
12	Given two concepts, select relationship.	14.0	12

[a]Five concepts did not possess appropriate subordinates. The numbers in parenthesis are extrapolations based on 30 items.

Table 5

Oblique Common Factor Results for
Language Arts Concepts: Boys and Girls[a]

Concept		Alpha A-1 Boys	Alpha A-1 Girls	A-2
Area:	Words			
1.	Abbreviation	81	98	
2	Compound Word	81	78	
3	Consonant	79	75	
4	Contraction	80	58	
5.	Homonym	80	89	
6	Short Vowel	80	81	
7	Silent Letter	84	107	
8	Suffix	83	30	42
9	Synonym	80	50	
10	Word	84	78	
Area:	Words in Sentences			
11	Adjective	78	-34	110
12.	Helping Verb	64		44
13.	Period	80	90	
14.	Possessive Noun	76		61
15.	Predicate	70		78
16	Present Tense	77	52	
17	Pronoun	82		63
18.	Question Mark	83	102	
19	Sentence	84	100	
20	Verb	79		88
Area:	Connected Discourse			
21	Comparison	80	48	33
22	Details	80	59	
23	Explanation	74	51	
24	Greeting	78	66	
25	Heading	59		52
26.	Paragraph	84	83	
27.	Return Address	73	86	
28	Thank You Letter	81	98	
29.	Title	82	89	
30	Topic Sentence	77	39	42

[a]Includes those variables which have coefficients greater than 30 (absolute) Decimals have been omitted.

Table 6

Oblique Common Factor Results for Language Arts Tasks: Boys and Girls[a]

	Task	Alpha A-1 Boys	Alpha A-1 Girls
1.	Given name of attribute, select example.	91	92
2	Given example of attribute, select name.	93	93
3	Given name of concept, select example.	91	91
4	Given name of concept, select nonexample.	89	88
5	Given example of concept, select name.	93	91
6	Given concept, select relevant attribute.	94	92
7	Given concept, select irrelevant attribute.	86	86
8	Given definition of concept, select name.	95	94
9	Given name of concept, select definition.	91	94
10	Given concept, select supraordinate concept.	92	92
11	Given concept, select subordinate concept.	86	85
12.	Given two concepts, select relationship.	84	90

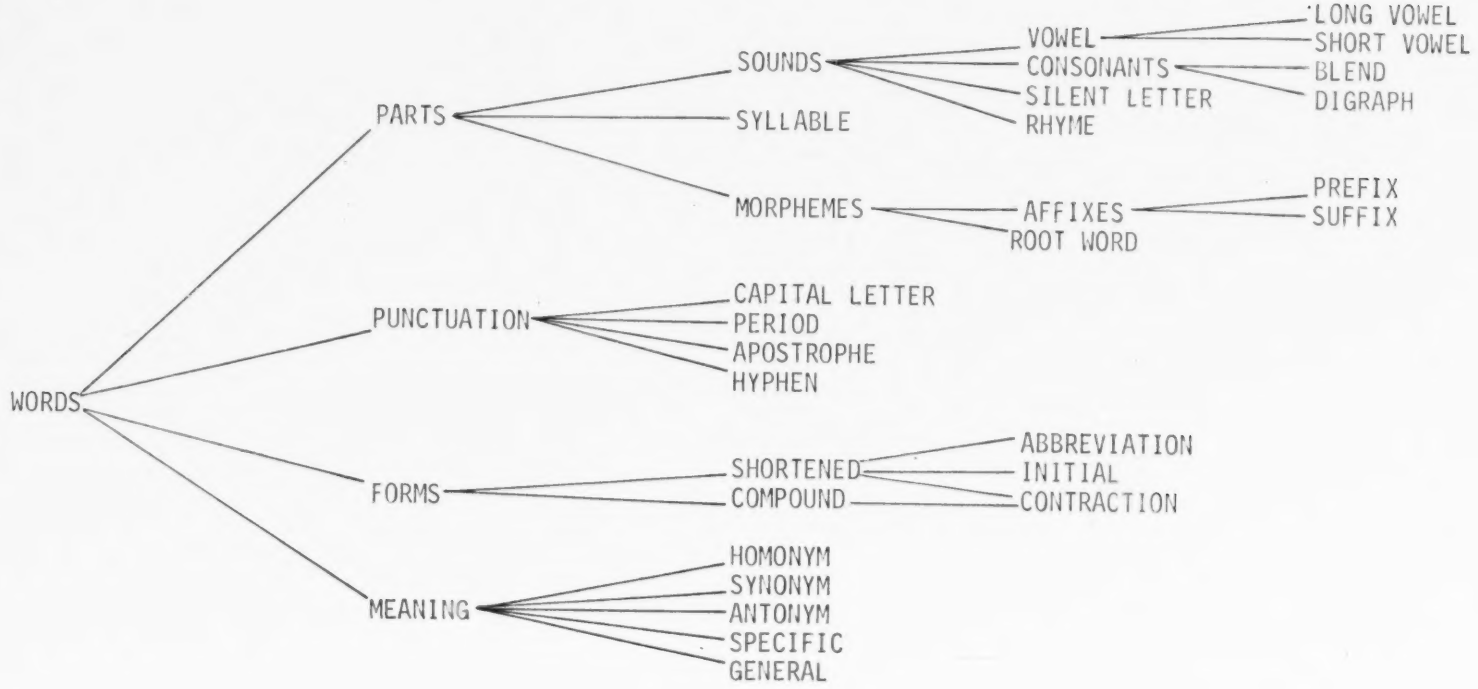

Fig. 1. Hierarchical Relationships Among the Concepts of Fourth-Grade Language Arts

Area 1: Words

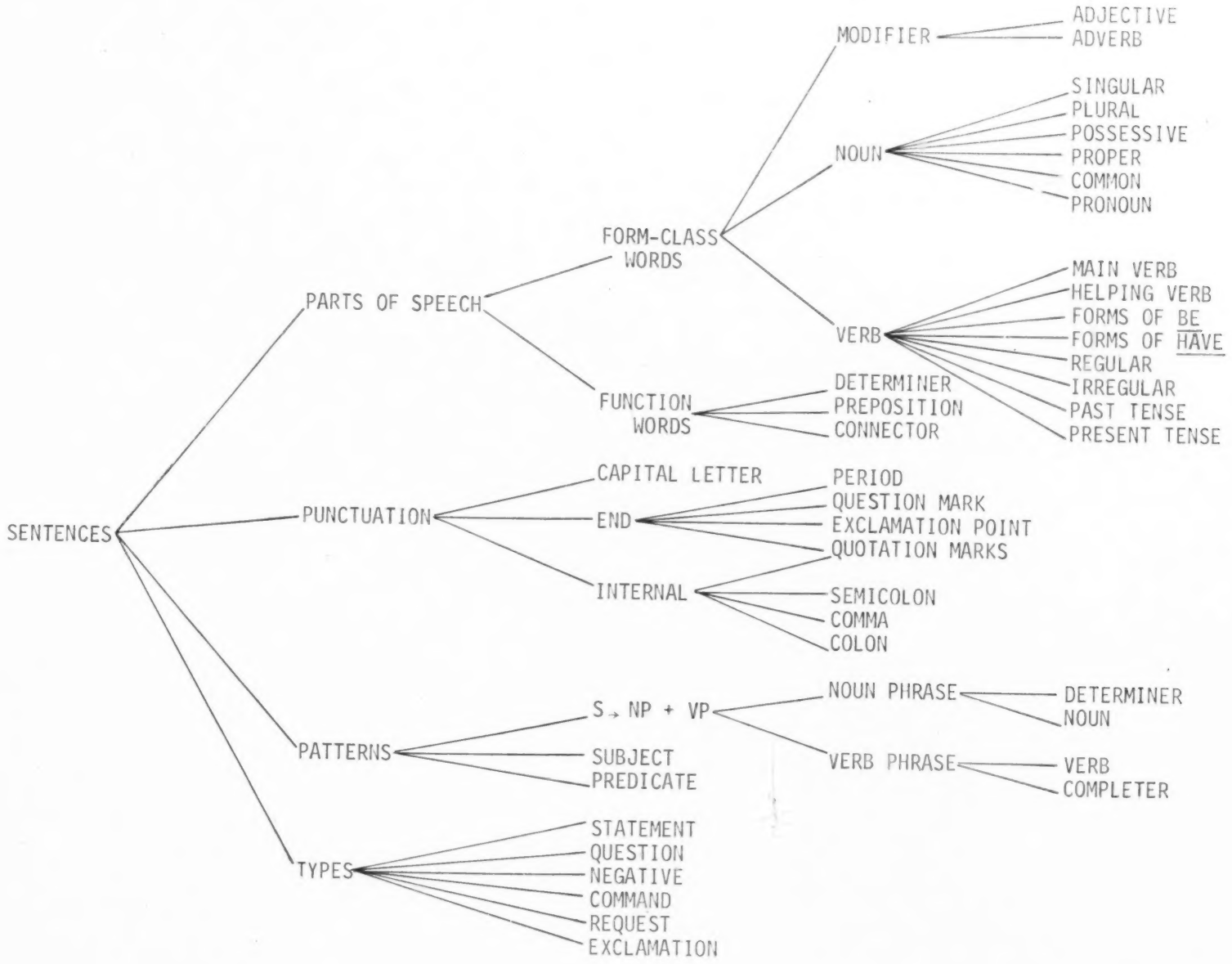

Fig. 2. Hierarchical relationships among the concepts of fourth-grade language arts.

Area 2: Words in Sentences

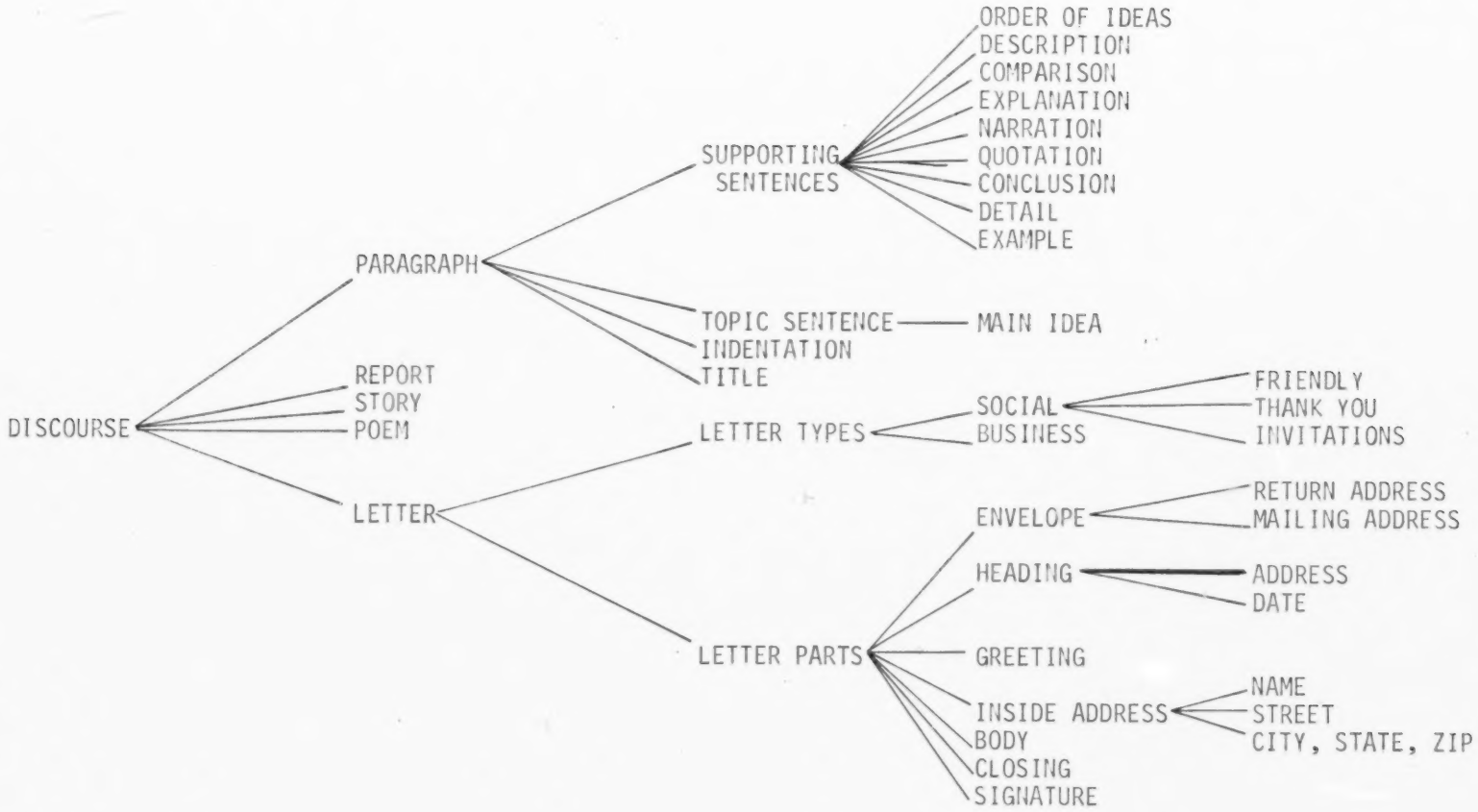

Fig. 3. Hierarchical relationships among the concepts of fourth-grade language arts

Area 3: Connected Discourse

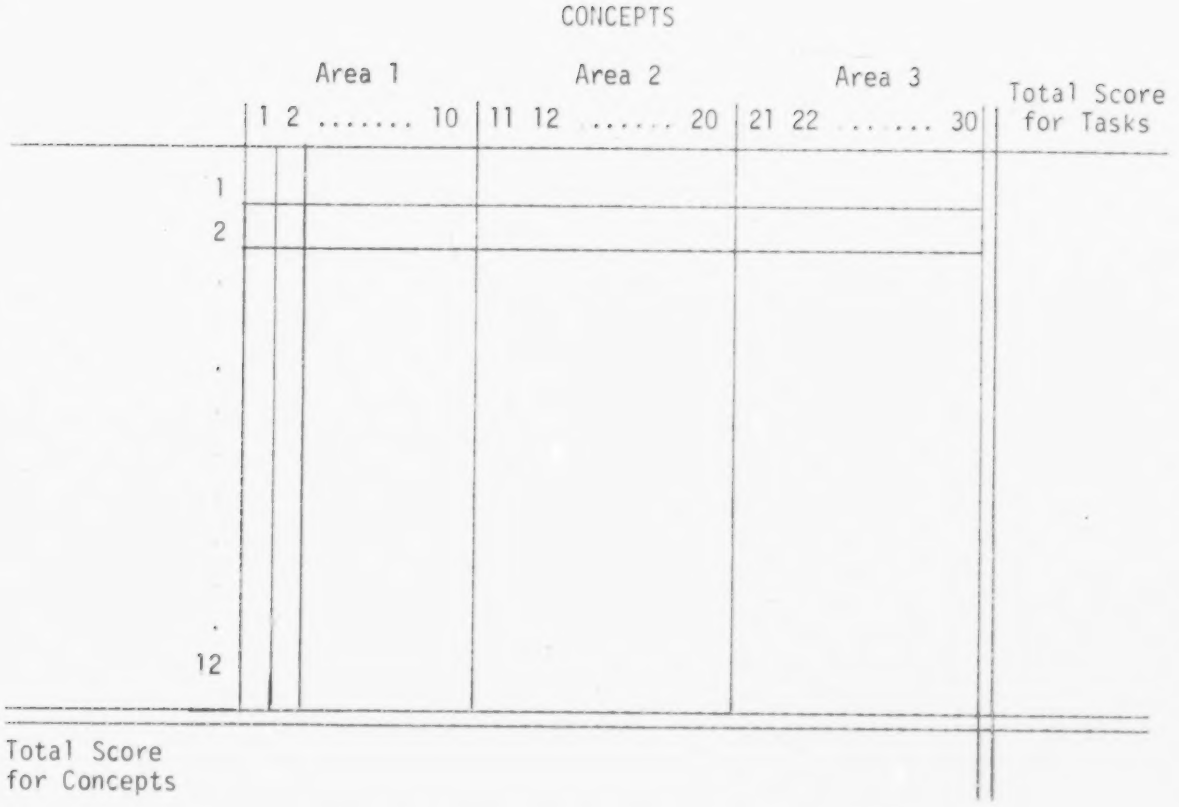

Fig. 4. Item matrix for each individual.